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Image 1. The first abandoned improvised mine (AIM) uncovered by HALO clearance teams in Helmand Province, southern Afghanistan. *All images courtesy of The HALO Trust.*

Improvised explosive devices (IEDs) have been widely used in Afghanistan since the mid-2000s, presenting a significant and life-threatening hazard to the civilian population. As areas become free from conflict and permissible for humanitarian clearance, an effective response is required to protect civilians. With the support of the Netherlands Ministry of Foreign Affairs and the German Federal Foreign Office, and in coordination with the Directorate of Mine Action Coordination (DMAC; the Afghan national mine action authority) and other stakeholders, The HALO Trust (HALO) has developed and implemented a successful *proof of concept* for manual clearance of victim operated IEDs (VOIEDs). While VOIEDs are cleared in other countries and have previously been cleared in Afghanistan, this project, delivered in Helmand province, has provided the opportunity to develop and test safer and more efficient methods for the targeted humanitarian clearance of abandoned improvised mines (AIM) in the current Afghan context. This article explains the path HALO has taken to deliver the proof of concept, some of the results so far, and future plans for supporting the sector.

THE AFGHAN CONTEXT

IEDs as Part of the Afghan Conflict. After the coalition of international military forces removed the government of the Islamic Emirate of Afghanistan in 2001, the regular and increasing presence of international military forces in the country encouraged armed opposition groups (AOGs) to adopt increasingly asymmetric tactics. The use of IEDs increased as conventional munitions became less available and effective against the technologically-advanced international military forces. Since this time, IEDs in Afghanistan have resulted in the death of thousands of civilians, of which a large proportion were inflicted by VOIEDs.

Terminology. In Afghanistan, the mine action sector has agreed that VOIEDs that function like conventional mines shall be known as improvised mines. They adhere to the definition found in the *Anti-Personnel Mine Ban Convention* (APMBC): "a mine designed to be exploded by the presence, proximity or contact of a person that will incapacitate, injure or kill one or more persons." In Afghanistan, the term AIM is used when improvised mines are no longer part of the active conflict.[1]

Engaging with Improvised Mines. In late 2016, the Afghan government, understanding the impact that improvised mines were having on the civilian population, requested the assistance of the

Image 2. A HALO training device shown in a distributed configuration, with the pressure plate, main charge, and battery pack separated from each other and connected with linking wire.

Images 3 and 4. Examples of carbon rod pressure and bare pressure plates splayed, showing the reduced metal electrical contacts inside the pressure plate.

Afghan humanitarian mine action sector (the Mine Action Programme for Afghanistan (MAPA)) to develop a response to the crisis. An initial assessment of affected districts identified large amounts of AIM contamination that were causing fatal or life-threatening accidents and posed a direct threat to the civilian population.

In early 2017, community representatives from several districts in central Helmand Province approached HALO with requests for the clearance of improvised mines from their villages. This prompted HALO to begin two strands of work: the first to determine the rationale for MAPA to engage with improvised mines; the second to develop a technical response to mitigate the threat posed by improvised mines.

The rationale for engagement was an important precursor to the development of the technical response and to the proof of concept. The work was carried out by consultant Dr. Rebecca Roberts and funded by the United Kingdom's Conflict, Stability, and Security Fund (CSSF). It explored the suitability of humanitarian clearance of improvised mines by MAPA under existing international and Afghan legal frameworks, and under existing MAPA strategies and policies. The views of a wide range of stakeholders including DMAC, other Afghan ministries, donors, and mine action operators were all considered.

Dr. Roberts' report found that there is a robust legal framework for humanitarian clearance of improvised mines under Afghan and international law where it is intended to protect civilians and their human rights. To conduct clearance, the report found that MAPA would need to maintain its status of neutrality in order to operate according to humanitarian principles of "do no harm," distance itself from ongoing conflicts, and deal with devices not considered part of the active conflict.

DEVELOPING THE TECHNICAL RESPONSE

To develop the technical response to mitigate the threat of improvised mines, HALO began expanding its understanding of the problem and preparing its in-country capacity. HALO assessed the physical environment where the clearance teams would be working, as well as the threats likely to be found in central Helmand Province and across Afghanistan.

In developing new techniques and procedures, HALO's approach was to extend existing humanitarian mine clearance practices by adapting and incorporating the relevant parts of military search and disposal techniques. This was to ensure that the knowledge, lessons learned, and experience from previous military operations could be assessed and incorporated into humanitarian practice where beneficial. This task was undertaken in early 2018 by bringing former-military IED disposal (IEDD) operators and humanitarian mine clearance operators together to devise, trial, and practice standard operating procedures (SOPs) tailored for the Afghan context.

HALO Afghanistan's program was able to draw on 30 years of in-country experience of clearing explosive hazards. This helped to ensure the development of capability and the operational response were contextually appropriate. Similarly, the project was sensitive to local politics, local security dynamics, and considerate of cultural and social norms.[2] With the support of HALO global experts, HALO Afghanistan developed SOPs and a training model that was then vetted externally by a third party providing an additional level of assurance. For this, HALO used the services of Artios Ltd. given their military, commercial, and NGO IEDD experience as well as their close involvement in the development of IMAS. Additionally, the SOPs and training were accredited by DMAC and reviewed by the United Nations Mine Action Service (UNMAS).

As part of the design of this project, HALO identified lessons and challenges experienced during the implementation phase in order to assist MAPA and inform the development of a wider AIM mine action capacity in Afghanistan.

Humanitarian Clearance, Consent, and Access. In Afghanistan, humanitarian clearance will only be conducted in permissible areas where active hostilities have ceased. AIMs in Afghanistan are almost always in areas that have experienced

Image 5. Local community members and survivors show the crater caused by a VOIED.

significant conflict. To keep clearance teams safe, HALO liaises extensively with key stakeholders to ensure that those with an interest understand our intent, and provide their consent for us to access areas to conduct clearance. HALO also conducts liaison with a variety of actors at a regional level to ensure that other actors are informed and aware of our activities and to address any concerns that may be raised. If required, clearance can be stopped and teams relocated until those concerns have been satisfied. In Helmand, HALO has had the full support of the local community and has been able to work uninterrupted. Looking ahead, obtaining and maintaining consent will likely be a key challenge requiring careful liaison and relationship building as AIM operations expand.

UNDERSTANDING IED DESIGN IN AFGHANISTAN

In building the technical response, it has been necessary for HALO to understand the design of IEDs in Afghanistan. IEDs in Afghanistan have evolved to defeat many modern detection methods and are usually intended to target the activities and tactics of specific military units working in an area. Two design elements of IEDs that are most relevant to this are the layout of the device and the material the switch is manufactured from. The use of a variety of detection technology by military forces may be one of the biggest driving factors for the evolution of these design features. In addition, IEDs in Afghanistan are known to include anti-handling elements, as either secondary components or secondary devices.

Device Layout. Almost all improvised mines in Afghanistan are electrically initiated and contain electrical circuits. These IEDs have batteries as a power source; batteries are easily found with a metal detector because of their high-metal content. However, the electrical wire linking the battery, the switch (often a pressure plate), and the main charge (with electric detonator) can be distributed around the emplacement location (see Image 3). This allows the emplacement of components to be more varied than a conventional pressure-activated mine and can make them more difficult to detect. For example, a pressure plate and a main charge with either a low-or no-metal content may be placed in the same location on a path, while the battery pack is placed several meters away from the path. This then places the easily detectable battery pack outside the natural search area, and makes the device more complex to detect.

The location of components can be configured to achieve different effects. For example, a main charge is easily placed away from a pressure plate targeting a vehicle, so that while the switch is activated by a vehicle tire, the main charge will function under the center of the vehicle where it is likely to inflict significantly greater damage.

Switch (Pressure Plate) Material. While there have been a number of switch types used in improvised mines in Afghanistan, including tripwires and pressure-release switches, it is anticipated that the vast majority of devices that humanitarian operators will clear will have pressure-plate switches. These are currently found in three main material types: high-metal-content pressure plates, which have large metal contacts; carbon-rod pressure plates made from a nonmetallic but

electrically-conducive materials (commonly found in household batteries); and bare-wire pressure plates that use stripped wire as the electrical contacts. These switch types have different levels of detectability.

Device Design. Due to the nature of improvised mines found in Afghanistan, AIM clearance in Afghanistan is significantly different from that of conventional mine clearance. Specific clearance methods, search tools, and explosive ordnance disposal (EOD) techniques are required.

Many AIMs in Afghanistan are assessed to have been emplaced with a separation of high-metal signal batteries and low-or no-metal signal pressure plates, which present challenges for clearance using standard techniques. The use of materials such as carbon rods can significantly reduce the detectability of the device and requires specialist IED detectors to be used. Specialized detectors are needed to be able to detect the location of the switch in an AIM, as this is likely to be the hardest component to locate while remaining the most sensitive part of the device.

Search Patterns. By understanding the layout of the device, clearance teams are able to adjust their search and clearance procedures to find more detectable and less sensitive components of a device before finding the harder-to-detect components. An example of this would be the deployment of deminers parallel to a path where batteries were assessed to be offset. The larger footprint of most AIMs has also encouraged the adoption of "2 m breaching" and "linear clearance" techniques. These are search patterns that allow a greater surface area to be searched prior to the deminer moving forward. This increases the chance that multiple components are initially located and reduces the chance that AIM components may be located in the uncleared area to the side of the deminer while remaining linked to components within the deminer's lane. This makes it easier and safer for the deminers and EOD operators to work after locating a potential device.

Device Employment. AIMs in Afghanistan are typically emplaced in smaller numbers than conventional minefields or the IED belts used in parts of Iraq. In addition, the AIM contamination encountered is typically in rural or semi-rural areas usually in small fields, compounds, or lengths of road or tracks. This requires survey teams and clearance team supervisors to be trained to recognize different contamination, potentially laid over different periods of time. For example, improvised mines in one area may use high-metal-content pressure plates and be laid in the middle of roads to target vehicles in the first contamination period, while the improvised mines may have carbon-rod pressure plates and be laid to the side of the roads targeting foot soldiers in the second contamination period. By understanding how IEDs are used, clearance methods can be adapted to ensure the safest and most effective clearance.

Team Management. The use of new techniques and procedures against a more complex threat requires a significantly higher level of supervision than that required by traditional mine clearance teams. HALO AIM clearance teams currently consist of four deminers with one team leader, who is also trained as an AIM EOD operator for this project. This high management ratio allows for strong supervision of clearance in and around compounds and allows the experienced team leaders more time to assess possible contamination and device patterns on their tasks. While the ratio of deminers to team leaders may change as HALO becomes more confident with AIM clearance, and while the role of AIM EOD operators may be separated from the role of team leader, the ratio of deminers to supervising staff is expected to remain significantly lower than traditional mine clearance teams.

IMPLEMENTATION

With the proof of concept receiving joint funding from the Netherlands Ministry of Foreign Affairs and the German Federal Foreign Office in June 2018, HALO was able to proceed with the recruitment and training of an AIM non-technical survey team (NTS) and two manual AIM clearance teams. The AIM NTS team

Images 6 (left) and 7 (right). An example of the standard Afghanistan "one man, one lane" (OMOL) technique with a searched area of 1.4 m x 0.3 m, compared to the HALO AIM 2 m breaching technique with a searched area of 2.4 m x 70 cm.

Image 8. A HALO AIM deminer conducts clearance in central Helmand.

Image 9. A HALO AIM deminer excavating signals in a 2 m breach lane.

was deployed operationally in Helmand in July 2018. The two manual AIM clearance teams were deployed to the same area in October 2018, with AIM clearance operations beginning in November 2018 following the receipt of accreditation from DMAC.

During this project, the HALO manual AIM clearance teams worked a total of 148 days and cleared 10,902 sq m across two AIM confirmed hazardous areas (CHAs). This equates to an average clearance rate of 73.7 sq m per day, or 9.5 sq m per deminer per day. During this time, the teams located and destroyed six emplaced AIMs, assisted in the safe disposal of an AIM uncovered near a task by a local farmer, and destroyed a main charge handed to the teams by the community. In addition, the survey team surveyed seventy-nine AIM CHAs with an average of 13,097 sq m per CHA and seven AIM suspected hazardous areas (SHAs) with an average of 37,295 sq m per SHA. The AIM survey team also investigated fifty-two EO accidents around central Helmand Province, almost all of which are assessed to have been caused by AIM contamination.

This project provided HALO the opportunity to assess its initial clearance procedures and with minor adjustments, proved that the procedures would continue to be successful against the target devices in central Helmand Province. In addition, HALO has also been able to conduct field-testing of several specialist IED detectors. These specialist detectors include ground penetrating radar (GPR) detectors optimized for the detection of short buried wires (like those found in the majority of AIM components). The benefit to AIM clearance is the ability to ignore many of the irrelevant metal signals that would require excavation and significantly slow the rate of clearance in the semi-rural areas.

NEXT STEPS

HALO's first AIM clearance project ended in June 2019, following nearly eight months of clearance by two manual AIM clearance teams and the release of two AIM contaminated areas. Having proved that AIM clearance is possible in Afghanistan, there are several challenges to address next. One challenge is to improve the speed and versatility of the current AIM clearance procedures in order to reduce the risk of accidents within the civilian population, releasing land for safe use and development more quickly. The second major challenge is how to scale up AIM clearance within the country.

HALO is assessing a number of methods of improving the speed and versatility of AIM clearance processes in Afghanistan. In July and August 2019, HALO conducted initial trials of mechanical AIM clearance methods, drawing from the lessons learned from HALO Iraq, and building upon the extensive mechanical clearance experience already held by HALO Afghanistan. These trials were further reinforced by additional trials in September and early October 2019, before two mechanical AIM clearance teams were deployed to the field in mid-October 2019. To improve clearance speed, HALO will also continue trials with a number of specialist IED detectors and search techniques. In September 2019, all HALO AIM deminers were trained in building and compound clearance techniques, enableing them to clear AIM contamination in the enclosed spaces that are accessed to be present on a high proportion of AIM clearance tasks in Afghanistan.

In order to scale up AIM clearance, MAPA is working with donors to raise awareness of the humanitarian need for AIM clearance. To assist, HALO is sharing the lessons identified during the proof of concept project through MAPA's AIM Technical Working Group. HALO will also continue conducting capacity development of others, such as the recent partnering and training of another operator to deliver AIM NTS for UNMAS. HALO will continue to develop its humanitarian AIM clearance capacity and to share lessons with partners, enabling the mine aciton sector to meet this urgent humanitarian need as soon as possible.

See endnotes page 61

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